9447

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PH. SCHUSTER, PAPIERHANDLUNG

I. III. S. 91/92

Dr. Josef Stefan

Magnetismus u. Elektricität.

M Smoluchowski

Wien, Wieden Hauptstrasse 55.

Theorie [illegible]

Elektrostatik — El. Strom [illegible] El. — ~~Elektrodyn. Induction~~

Magnetismus [illegible]

[illegible] El. magn. [illegible] — Elektrodynamik — El. dyn. Induction

Elektrische [illegible]

Theoretische [illegible] Coulomb

[illegible] El. [illegible] Gilbert [illegible] 1600 [illegible]

[illegible] el. [illegible]

[illegible] 1685 [illegible] Guericke

[illegible]

[illegible]

[illegible] Gray [illegible]

[illegible] el. [illegible] Hauf. [illegible] El. [illegible]

[illegible] El.

Isolir[illegible]

Du Fay 1735 [illegible] El. [illegible] ± [illegible]

[illegible] El. [illegible]

Franklin [illegible] Hypoth.; [illegible] fluidum

[illegible] ponder. Mat.; [illegible] Mat. [illegible]

[illegible] ponder. Mat. [illegible]

[illegible] El. [illegible]; neg. el. [illegible] El. [illegible]

[illegible] + [illegible]

[illegible] El. [illegible]; [illegible] ponder. [illegible]

[illegible] Grav. = Res. [illegible] pond. Acht. [illegible] El.

[illegible] Du Fay [illegible]

Symmer [illegible] (+ −) Theorie [illegible]

[[illegible]]

Coulomb [illegible] Theorie [illegible]

1736 [illegible], Genieoffizier [illegible] Martinique [illegible]

[illegible] Paris [illegible] mech. [illegible] math. [illegible] Theorie [illegible]

Gewölbe [[illegible]]. Theorie [illegible]

[illegible]

[illegible] Torsion [illegible]

[illegible] Torsion [illegible]

[illegible] [[illegible]]

[illegible] Torsions∠ [illegible]

[illegible] ∠ [illegible]

[illegible] Dim. [illegible] 4ten Pot. [illegible]

[illegible] theor. [illegible] theor. [illegible] Elast.

[illegible] El.

[illegible] Grav. [illegible]

16/10 Coulomb [illegible]

[illegible] Coulomb. [illegible]

Silberdraht

[illegible]

[illegible] elektr. [illegible]

[illegible]

[illegible]

T = Torsions coeff.

$T\alpha =$ [illegible]

$$\frac{A}{d^n} = 1$$

$$\frac{A p}{d^n} = T\alpha$$

$$p = l \cos\frac{\alpha}{2}$$

$$d = 2 l \sin\frac{\alpha}{2}$$

$$\frac{A l \cos\frac{\alpha}{2}}{2^n l^n \sin^n\frac{\alpha}{2}} = T\alpha$$

$$\frac{A l}{2^n l^n T} = \alpha \sin^{n-1}\frac{\alpha}{2}\,\operatorname{tg}\frac{\alpha}{2}$$ [illegible]

[illegible]

[illegible]

$$T(\gamma+\beta) = \frac{A l \cos\frac{\gamma}{2}}{2^n l^n \sin^n\frac{\gamma}{2}}$$

$$\left.\begin{aligned} \frac{A l}{2^n l^n T} &= (\beta+\gamma)\sin^{n-1}\frac{\gamma}{2}\,\operatorname{tg}\frac{\gamma}{2} \\ \frac{A l}{2^n l^n T} &= (\beta'+\gamma')\sin^{n-1}\frac{\gamma'}{2}\,\operatorname{tg}\frac{\gamma'}{2} \end{aligned}\right\} n = ?$$

[illegible] Coulomb [illegible] $n = 2$

[illegible]

[illegible]

[illegible]

[illegible] 100

[illegible] consequ. [illegible]

[illegible]

[illegible]

[illegible] $\varepsilon \frac{ee'}{r^2} = /$ [illegible]

[illegible]

[illegible] cm^3 [illegible] gramm [illegible] sec. [illegible]

$P = Mg$ $M = 1$ $g = 1$ $P =$ [illegible]

[illegible] $= 1$ [illegible] [cm] $s = 1$ [sec]

[illegible] $= 1 = cm^3$ [illegible] $4°C$.

[illegible] Coulomb [illegible]

$\varepsilon \frac{e^2}{r^2}$ [illegible] $e = e'$ [illegible] $= 1$

$= /$ $\frac{e^2}{r^2} = /$ [illegible] $e = r\sqrt{/}$

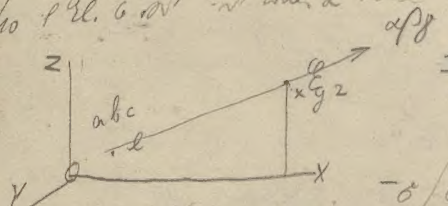
[illegible]

[illegible] $/ = 1$, $r = 1$ [illegible] $e = 1$

[illegible]

[illegible]

20/10 [illegible] Coul. [illegible]



$\frac{e\varepsilon}{r^2} = /$ [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

$r^2 = (x-a)^2 + (y-b)^2 + (z-c)^2$

$\cos\alpha = \frac{x-a}{r}$ $\cos\beta = \frac{y-b}{r}$ $\cos\gamma = \frac{z-c}{r}$

$$X = \frac{e\xi}{r^2}\cos\alpha = \frac{e\xi(x-a)}{r^3}$$

$$Y = \frac{e\xi(y-b)}{r^3}$$

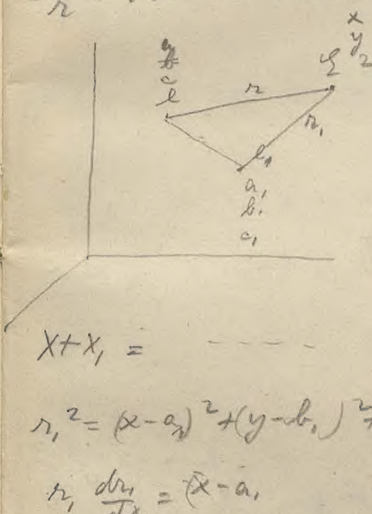
$$Z = \frac{e\xi(z-c)}{r^3}$$

$$r\frac{dr}{dx} = x-a \qquad X = \frac{e\xi}{r^2}\frac{dr}{dx} = -e\xi\frac{d}{dx}\left(\frac{1}{r}\right) = -\frac{d}{dx}\left(\frac{e\xi}{r}\right)$$

$$\frac{x-a}{r} = \frac{dr}{dx} \qquad Y = -\frac{d}{dy}\left(\frac{e\xi}{r}\right) \quad Z = -\frac{d}{dz}\left(\frac{e\xi}{r}\right)$$

p Comp. [illegible]

$\frac{e\xi}{r}$ = Potential [illegible]



$$\frac{e\xi}{r^2} \quad \frac{e_1\xi}{r_1^2}$$

$$X = \frac{e\xi}{r^2}\frac{x-a}{r}$$

$$X_1 = \frac{e_1\xi}{r_1^2}\frac{x-a_1}{r_1}$$

$$X + X_1 = \text{---}$$

$$r_1^2 = (x-a_1)^2 + (y-b_1)^2 + (z-c_1)^2$$

$$r_1\frac{dr_1}{dx} = x-a_1$$

$$\frac{dr_1}{dx} = \frac{x-a_1}{r_1} \qquad X_1 = \frac{e_1\xi}{r_1^2}\frac{dr_1}{dx} = -\frac{d}{dx}\left(\frac{e_1\xi}{r_1}\right)$$

$$X + X_1 = -\frac{d}{dx}\left(\frac{e\xi}{r}\right) + \frac{d}{dx}\left(\frac{e_1\xi}{r_1}\right)$$

$$= -\frac{d}{dx}\left(\frac{e\xi}{r} + \frac{e_1\xi}{r_1}\right)$$

[illegible] Pot. = Pot. [illegible]

[illegible]

$$\frac{e\xi}{r} + \frac{e_1\xi}{r_1} + \frac{e_2\xi}{r_2} + \text{---} = \sum\frac{e\xi}{r}$$

$= \varepsilon \sum \frac{e}{r}$ ... $\frac{e}{\varepsilon} = 1$ ... $\sum \frac{e}{r}$ = Pot. ... $\varepsilon(=1)$

...

$\sum \frac{e}{r} = U$ = Pot. ... xyz

$X = -\frac{dU}{dx} \quad Y = -\frac{dU}{dy} \quad Z = \cdots$

... cont. ... el. ...

... ∞ ... etc.

... Pot

... Vol. ... Vol. Pot ... = Pot = ρ

$$\boxed{\begin{aligned} dV &= \text{... Vol.} \\ \rho\, dV &= e \end{aligned}}$$

... El. ...

... ∞ ... el. ...

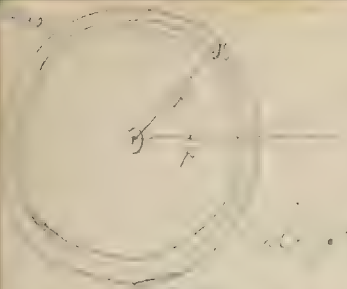
... El. mult. ... Pot = 0

$\sigma\, dF = e$

... Pot const. ...

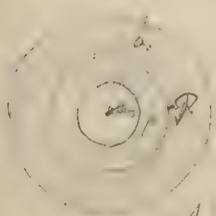
... Pot. $\int \frac{dV}{r}$ ... Vol. mult. ...

...



$U_i = 2\pi\rho$ ...

$$\int_{a_0}^{a_1} 4\pi\rho\, s\, ds = 2\pi\rho \frac{s^2}{2}\Big|_{a_0}^{a_1} = 2\pi\rho\left[a_1^2 - a_0^2\right]$$



... a_0, p

(1) $\dfrac{\frac{4\pi}{3}\left[p^3 - a_0^3\right]\cdot\rho}{p}$ (2) $2\pi\rho\left[a_1^2 - p^2\right]$

$$U = \frac{4\pi}{3}\left[p^2 - \frac{a_0^3}{p}\right]\rho + 2\pi\rho\left[a_1^2 - p^2\right]$$

$$= 2\pi\rho a_1^2 - \frac{4\pi\rho}{3}\frac{a_0^3}{p} - \frac{2\pi\rho}{3}p^2$$

$$U = 2\pi\rho a_1^2 - \frac{2\pi\rho}{3}p^2$$

$$\frac{dU}{dp} = -\frac{4\pi\rho}{3}p$$

$U_1 = [illegible] (a_1^2 - a_0^2)$

$U_1 = 2\pi\rho a_1^2 - [illegible] - \frac{2\pi\rho}{3} p^2$

$U_3 = [illegible]$

[illegible]

$p = a_0 \quad U_1 = 2\pi\rho (a_1^2 - a_0^2)$ [illegible]

[illegible]

$p = [illegible]$ [illegible]

$\frac{dU}{dp} = 0 \qquad \frac{dU_2}{dp} = + \frac{[illegible]}{3p^2} - \frac{[illegible]\rho}{3} p$

$\frac{dU}{dp} = -\frac{4\pi\rho (a_1^3 - a_0^3)}{3p^2}$ [illegible]

[illegible]

[illegible]

[illegible]

$dV = [illegible]$

$\int \frac{dV\rho}{r} = U \qquad r^2 d\omega$

$\int \frac{\rho r^2 d\omega dr}{r}$ [illegible]

[illegible] $= 0$

[illegible]

[illegible]

$U = \Sigma \frac{\rho dV}{r} \qquad r^2 = (a-x)^2 + (b-y)^2 [illegible]$

$\frac{dU}{da} = -\Sigma \frac{\rho dV}{r^2} \frac{dr}{da}$

$r\frac{dr}{dx} = -(a-x)$

$\frac{dU}{dx} = + \Sigma \frac{\rho\, dV\, (a-x)}{r^3}$ [illegible]

$a - x = r\cos\vartheta \qquad \frac{dU}{dx} = \Sigma \frac{\rho\, dV \cos\vartheta}{r^2}$ [illegible]

[illegible]

[illegible]

$$\frac{d^2U}{dx^2} = \Sigma \rho\, dV \left[\frac{-1}{r^3} - \frac{(a-x)\,3}{r^4} \frac{dr}{dx} \right]$$

$$= \Sigma \rho\, dV \left[-\frac{1}{r^3} + \frac{3(a-x)^2}{r^5} \right]$$

[illegible]

[illegible]

[illegible]

23' [illegible] $r^2 = (x-a)^2 + (y-b)^2 + (z-c)^2$

$$\frac{d}{dx}\left(\frac{1}{r}\right) = -\frac{1}{r^2}\frac{dr}{dx} = -\frac{x-a}{r^3}$$

$$\frac{d^2}{dx^2}\left(\frac{1}{r}\right) = -\frac{1}{r^3} + 3\frac{x-a}{r^4}\frac{dr}{dx} = -\frac{1}{r^3} + 3\frac{(x-a)^2}{r^5}$$

$$\frac{d^2}{dy^2}\left(\frac{1}{r}\right) = -\frac{1}{r^3} + 3\frac{(y-b)^2}{r^5}$$

$$\frac{d^2}{dz^2}\left(\frac{1}{r}\right) = -\frac{1}{r^3} + 3\frac{(z-c)^2}{r^5}$$

$$\frac{d^2}{dx^2}\left(\frac{1}{r}\right) + \frac{d^2}{dy^2}\left(\frac{1}{r}\right) + \frac{d^2}{dz^2}\left(\frac{1}{r}\right) = -\frac{3}{r^3} + 3\frac{1}{r^3} = 0$$

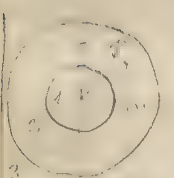
[illegible]

[illegible]

$$u = \int \frac{\rho\, d\tau}{r}$$

$$\frac{d^2 u}{dx^2} = \int \rho\, d\tau\, \frac{d^2}{dx^2}\left(\frac{1}{r}\right)$$

$$\frac{d^2 u}{dx^2} + \frac{d^2 u}{dy^2} + \frac{d^2 u}{dz^2} = 0$$



$$U_1 = 2\pi\rho a^2 - \frac{2\pi}{3}\rho r^2 - \frac{4\pi\rho}{3}\frac{a_0^3}{r}$$

$a_0 = 0$

$$U_1 = 2\pi\rho a^2 - \frac{2\pi\rho}{3} r^2$$

$$r_1^2 = (x-\alpha)^2 + (y-\beta)^2 + (z-\gamma)^2$$

$$U_2 = 2\pi\rho a_1^2 - \frac{2\pi\rho}{3}\left[(x-\alpha)^2 + (y-\beta)^2 + (z-\gamma)^2\right]$$

$$\frac{dU_2}{dx} = -\frac{4\pi\rho}{3}(x-\alpha)$$

$$\frac{d^2 U_2}{dx^2} = -\frac{4\pi\rho}{3} \qquad \frac{d^2 U_2}{dy^2} = -\frac{4\pi\rho}{3} \qquad \frac{d^2 U_2}{dz^2} = -\frac{4\pi\rho}{3}$$

$$\frac{d^2 U_2}{dx^2} + \dots = -4\pi\rho$$

[illegible]

$$\ldots = \underbrace{\ldots}_{=0} \ldots \underbrace{\ldots}_{=4\pi\rho}$$

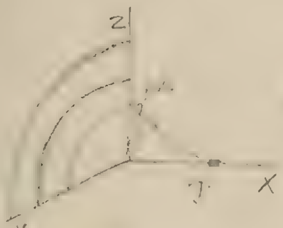
[illegible]

[illegible] Coincidenz

[illegible] $= 0$.

$$\frac{dX}{dx} + \frac{dY}{dy} + \frac{dZ}{dz} = \Delta U$$

[illegible]



$$U = \int \frac{2\pi\sigma \ldots}{\sqrt{x^2+a^2}} = 2\pi\sigma \sqrt{x^2+a^2} \Big| =$$

$$= 2\pi\sigma \left[\sqrt{x^2+a_1^2} - \sqrt{x^2+a_0^2}\right]$$

$\underline{a_0 = 0}$ $U = 2\pi\sigma\left[\sqrt{x^2+a_1^2} - \sqrt{x^2}\right]$ [illegible]

$$U_+ = 2\pi\sigma\left[\sqrt{x^2+a_1^2} - x\right]$$

$$U_- = 2\pi\sigma\left[\sqrt{x^2+a_1^2} + x\right]$$

[illegible] $U = 2\pi\sigma a_1$

[illegible]

$$\frac{dU_+}{dx} = 2\pi\sigma\left[\frac{x}{\sqrt{x^2+a_1^2}} - 1\right] \qquad \frac{dU_-}{dx} = 2\pi\sigma\left[\frac{x}{\sqrt{x^2+a_1^2}} + 1\right]$$

[illegible]

$x = +0$: $\frac{dU_+}{dx} = -2\pi\sigma$ | $x = -0$: $\frac{dU_-}{dx} = +2\pi\sigma$

$$\frac{dM_2}{dx} - \frac{dM_1}{dx} = -4\pi\sigma$$

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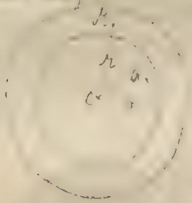
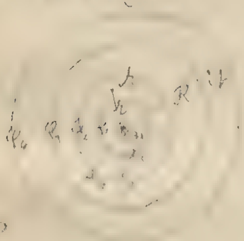
$X =$

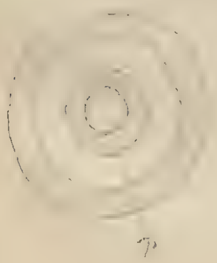




$$\frac{q_1}{a_1} + \frac{q_2}{a_2} + \frac{q_3}{a_3} + \frac{q_4}{a_4} + \dots$$

$q_1 + q_2 + q_3 = 0$

$q_2 = -q_3$



$$\frac{q}{a} + \frac{q_2}{a_2} + \frac{q_3}{a_3} + \frac{q_4}{a_4}$$

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] $= 0$

[illegible]

$Q_1 + [illegible] = 0$

$i_2 = -Q_1$

[illegible] and [illegible]

[illegible]

$\frac{Q_2}{a_2} - \frac{Q_2}{a_3} + \frac{Q_2}{a_4} - \frac{Q_2}{a_5} = 0$

$Q_2\left[\frac{1}{a_2} - \frac{1}{a_3} + \frac{1}{a_4} - \frac{1}{a_5}\right] = 0$

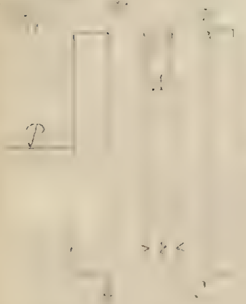
$Q_2\left[\frac{a_3 - a_2}{a_2 a_3} + \frac{a_5 - a_4}{a_4 a_5}\right] = 0$

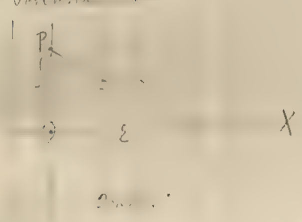
[illegible]

$a_2 a_3 = c^2$ [illegible] $\frac{a_2}{a_3}$

$a_4 a_5 = c^2$ [illegible] $\frac{a_4}{a_5}$

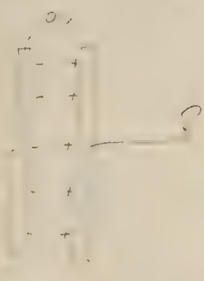
$Q_2\left[\underbrace{a_3 - a_2}_{} - \underbrace{a_5 - a_4}_{}\right] = 0$





[illegible]

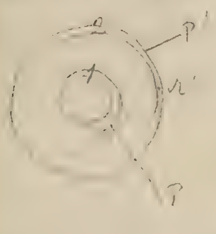
Capacitance [illegible]



[illegible]

[illegible]

[illegible]



$$\frac{Q_1}{a_1} + \frac{Q_2}{a_2} + \frac{Q_3}{a_3} + \frac{Q_4}{a_4} = P \qquad Q_1 = 0 \qquad Q_1 + Q_2 + Q_3 = 0$$

$$\frac{Q_1 + Q_2 + Q_3}{a'} + \frac{Q_4}{a_4} = P'$$

$$\frac{Q_2}{a_2} + \frac{Q_3}{a_3} = P - P'$$

$$Q_2\left(\frac{1}{a_2} - \frac{1}{a_3}\right) = P - P'$$

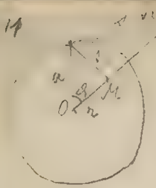
$$Q_5 = Q_4$$

$$\frac{e}{r} + U_1 = C$$

$$U_1 = C - \frac{e}{r} = C - \frac{e}{\sqrt{p^2 + r^2 - 2pr\cos\theta}}$$

$$-4\pi\sigma = \frac{dU_1}{dn} - \frac{dU_2}{dn}$$

$$= \frac{dU_1}{dn} - \frac{dU_2}{dn}$$



$\sigma\, dF$ $\quad \frac{\sigma\, dF}{r} = \ldots$

$$\int \frac{\sigma\, dF}{r} = U_i = \ldots$$

$r^2 = a^2 + r^2 - 2ar\cos\varphi$ [illegible]

$$U_i = \int \frac{\sigma\, dF}{\sqrt{a^2+r^2-2ar\cos\varphi}}$$

$$= \frac{1}{a}\int \frac{\sigma\, dF}{\sqrt{1-\frac{2r}{a}\cos\varphi+\frac{r^2}{a^2}}}$$

$$\frac{1}{\sqrt{1-\frac{2r}{a}\cos\varphi+\frac{r^2}{a^2}}} = 1 + P_1\frac{r}{a} + P_2\frac{r^2}{a^2} + \ldots$$

P_1 [illegible]

[illegible]

$$U_i = \frac{1}{a}\int \sigma\, dF\left[1+P_1\frac{r}{a}+P_2\frac{r^2}{a^2}+\ldots\right]$$

$$= \frac{1}{a}\left\{\int \sigma\, dF + \frac{r}{a}\int P_1\sigma\, dF + \frac{r^2}{a^2}\int P_2\sigma\, dF + \ldots\right\}$$

$$= \frac{1}{a}\left\{Q_0 + \frac{r}{a}Q_1 + \frac{r^2}{a^2}Q_2 + \ldots\right\}$$

Q_0 [illegible]

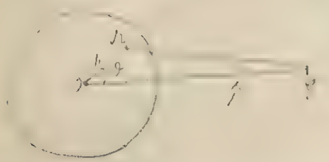
$Q_0 =$ [illegible]

[illegible] $r > a$

$$U_e = \int\frac{\sigma\, dF}{\sqrt{a^2+r^2-2ar\cos\varphi}} = \frac{1}{r}\int\frac{\sigma\, dF}{\sqrt{1-2\frac{a}{r}\cos\varphi+\frac{a^2}{r^2}}} =$$

$$= \frac{1}{r}\int\sigma\, dF\left[1+P_1\frac{a}{r}+P_2\frac{a^2}{r^2}+\ldots\right]$$

$U_i = C - \dfrac{q}{\sqrt{p^2 + r^2 - 2pr\cos\vartheta}}$



$U_e = C - \dfrac{q}{\sqrt{p^2 + a^2\frac{r^2}{a^2} - 2pa\frac{r}{a}\cos\vartheta}}$

$= \dfrac{aC}{a} - \dfrac{aq}{a\sqrt{\frac{p^2}{a^2} + \frac{r^2}{a^2} - 2\frac{p}{a}\frac{r}{a}\cos\vartheta}}$

$U_e = \dfrac{ca}{r} - \dfrac{q}{r\sqrt{\frac{p^2}{a^2} + \frac{a^2}{r^2} - 2\frac{p}{a}\frac{a}{r}\cos\vartheta}}$

$= \dfrac{ca}{r} - \dfrac{q}{\sqrt{\frac{p^2r^2}{a^2} + a^2 - 2pr\cos\vartheta}}$

$-4\pi\sigma = \left(\dfrac{dU_e}{dr} - \dfrac{dU_i}{dr}\right)_{r=a}$

$-4\pi\sigma = -\dfrac{ca}{a^2} + \dfrac{q\left[\frac{p^2 r}{a^2} - p\cos\vartheta\right]}{\left[\frac{p^2r^2}{a^2} + a^2 - 2pr\cos\vartheta\right]^{\frac{3}{2}}} + ca -$

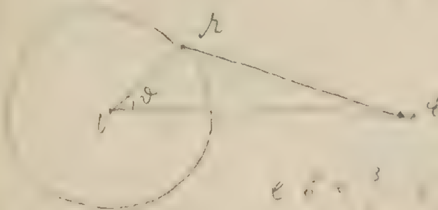
$-4\pi\sigma = -\frac{e}{a} + \ldots$ [illegible]

$4\pi\sigma = +\frac{e}{a} + \frac{\mathfrak{E}}{a}\frac{p^2-a^2}{(p^2+a^2-2pa\cos\vartheta)^{\frac{3}{2}}}$

[illegible]

$4\pi\sigma = -\frac{\mathfrak{E}}{a}\frac{p^2-a^2}{(\quad)^{\frac{3}{2}}}$

$\sigma =$ [illegible]



[illegible]

[illegible]

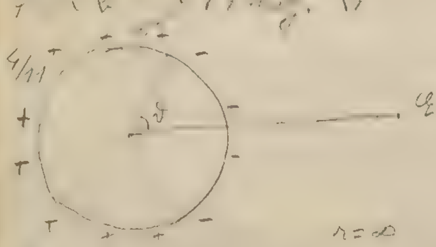
[illegible]

$p : 2 = 27 : 1$ [illegible]

[illegible]

[illegible]

[illegible]



$u_i = e - \frac{\mathfrak{E}}{\sqrt{\ldots}}$

$u_e = \frac{ea}{r} - \frac{\mathfrak{E}a}{r\sqrt{p^2 + \frac{a^4}{r^2} - 2\frac{a^2}{r}p\cos\vartheta}}$

$u_e = \underbrace{\frac{ea}{r}}_{\text{Pol. + El.}} - \frac{\mathfrak{E}a}{rp}$

[illegible]

15

$C = \frac{q}{p}$

$$i + b = \frac{q}{p a} - \frac{q (p^2 - a^2)}{a\, r^3}$$

$$r^3 = p (p^2 - a^2)$$

$$r = \sqrt{p^2 + a^2 - 2ap \cos\theta} = \sqrt[3]{p (p^2 - a^2)}$$

$$p^2 + a^2 - 2ap\cos\theta = \sqrt[3]{p^2 (p^2 - a^2)^2}$$

$$2ap\cos\theta = p^2 + a^2 - \sqrt[3]{p^2 (p^2 - a^2)^2}$$

$2a$

$$4a^2 \cos\theta = 5a^2 - \sqrt[3]{36 a^6}$$

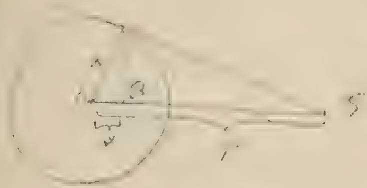
$$\cos\theta = \frac{5 - \sqrt[3]{36}}{4} = \frac{5 - 3.3}{4} = \frac{1.7}{4} = 0.425$$

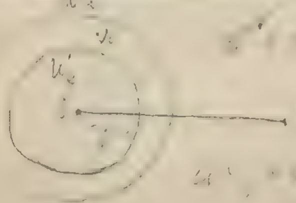
$\theta = 90°$

$$V_e = \frac{q a}{r p} - \frac{q a}{\sqrt{p^2 r^2 + a^4 - 2a^2 p r \cos\theta}}$$

$$= \frac{q a}{r p} - \frac{q a}{p \sqrt{r^2 + \frac{a^4}{p^2} - 2\frac{a^2}{p} r \cos\theta}} \qquad \left| \frac{a^2}{p} = x \right.$$

$$= \qquad \frac{\quad}{p \sqrt{r^2 + x^2 - 2 r x \cos\theta}}$$





$U'_e + U''_i + \frac{q}{\sqrt{\rho^2+r^2-2\rho r\cos w}} = \text{Const}$

$U''_i = \frac{q}{a} + \frac{q_1 r}{a} + \frac{q_2 r^2}{a^2} \quad \frac{1}{a}\left\{q_0'' + q_1''\frac{r}{a} + q_2''\frac{r^2}{a^2} + \dots\right\}$

$U'_e = \frac{1}{r}\left[q_0' + q_1'\frac{b}{r} + q_2'\frac{b^2}{r^2} + \dots\right]$

$\frac{q}{\sqrt{\rho^2+r^2-2\rho r\cos w}} = \frac{q}{\rho}\left(1-2\frac{r}{\rho}\cos w+\frac{r^2}{\rho^2}\right)^{-\frac{1}{2}} =$

$= \frac{q}{\rho}\left[1+\frac{P_1 r}{\rho}+\frac{P_2 r^2}{\rho^2}+\dots\right]$

$\frac{1}{r}\left\{q_0'+q_1'\frac{b}{r}+\dots\right\}+\frac{1}{a}\left\{q_0''+q_1''\frac{r}{a}+\dots\right\}+\frac{q}{\rho}\left\{1+\frac{P_1 r}{\rho}+\frac{P_2 r^2}{\rho^2}+\dots\right\}=C$

$\varphi_0' =$ [illegible]

$\frac{1}{2}$ [illegible] $+ \frac{1}{r} = C$

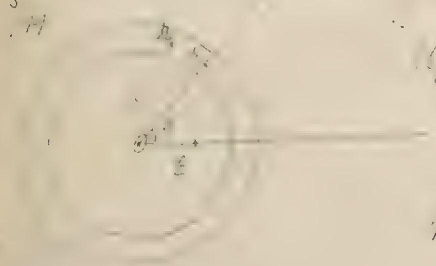
$-\frac{\varphi_0''}{2^2}$ [illegible]

[illegible]

[illegible]

[illegible]

5



[illegible] C

p. 38

$U_i' = \frac{\varphi'}{R} - \frac{\varphi}{R^2}$ [illegible]

$U_i'' = \frac{\varphi}{a} +$ [illegible]

$$\frac{\varepsilon}{\sqrt{\ldots\cos\theta}} = \frac{\varepsilon}{a\sqrt{1 - \frac{2\varrho}{a}\cos\theta + \ldots}} = \frac{\varepsilon}{\ldots}$$

$$= \frac{\varepsilon}{R}\left[1 + P_1 \frac{\varrho}{R} + P_2 \frac{\varrho^2}{R^2} + \ldots\right]$$

[illegible]

[illegible]

$\frac{\varphi''}{a} = C \qquad \varphi' - \varphi = 0$ [illegible]

$\varphi_1' + \varepsilon P_1 = 0$

$U_i'' =$ [illegible]

[illegible] ε

[illegible]

$$U_i' = -\frac{e}{\sqrt{\rho^2 + r^2 - 2\rho r \cos\theta}} = -\frac{e}{\rho\sqrt{\frac{r^2}{\rho^2} + 1 - 2\frac{r}{\rho}\cos\theta}}$$ [illegible]

$$U_i' = -\frac{e}{b\sqrt{\frac{a^2}{b^2} r^2 + 1 - 2\frac{a}{b} r \cos\theta}}$$

$$-4\pi\sigma = \left[\frac{\partial V_1}{\partial r} - \frac{\partial V_2}{\partial r}\right]_{r=a}$$

$$= \left[\frac{\mathcal{E}\,(r - p\cos\theta)}{\left[r^2 + p^2 - 2pr\cos\theta\right]^{\frac{3}{2}}} - \frac{\mathcal{E}\,(\frac{a^2}{p^2}r - \frac{a}{p}\cos\theta)}{\frac{a}{p}\left[\frac{a^2}{p^2}r^2 + 1 - 2\frac{a}{p}r\cos\theta\right]^{\frac{3}{2}}}\right]_{r=a}$$

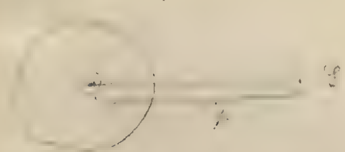
$$= \frac{\mathcal{E}\,(a - p\cos\theta)}{\left[a^2 + p^2 - 2pa\cos\theta\right]^{\frac{3}{2}}} - \frac{\mathcal{E}\,(\frac{p^2}{a} - p\cos\theta)}{\left[\ldots\right]^{\frac{3}{2}}} =$$

$$-4\pi\sigma = \frac{\mathcal{E}\left[a^2 - p^2\right]}{a\left[a^2 + p^2 - 2pa\cos\theta\right]^{\frac{3}{2}}}$$ [illegible]

[illegible]

$V_e = -\frac{\mathcal{E}}{a}$ [illegible]

[illegible]



$$-4\pi\sigma = \frac{\mathcal{E}\,(p^2 - a^2)}{a\left[\ldots\right]^{\frac{3}{2}}}$$

$$= \frac{\mathcal{E}\,(p^2 - a^2)}{a\left[p^2 + a^2 - 2ap\cos\theta\right]^{\frac{3}{2}}}$$

[illegible]

$p - a = f$ $\quad 4\pi\sigma = -\frac{\mathcal{E}\, f\,(p + a)}{a\left[(a+f)^2 + a^2 - 2a(a+f)\cos\theta\right]^{\frac{3}{2}}}$

$a = \infty$

$$4\pi\sigma = \frac{2\mathcal{E}\, f}{\left[a^2 + 2af + f^2 + a^2 - 2a^2\cos\theta - 2af\cos\theta\right]^{\frac{3}{2}}}$$

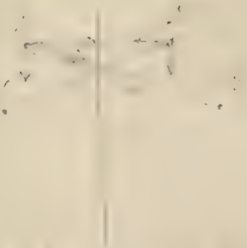
[illegible]

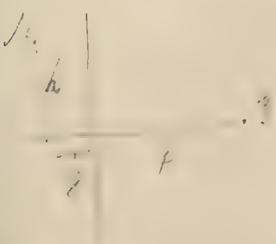
$$\frac{2\mathcal{E} f}{f^3} = \frac{2\mathcal{E}}{f^2}$$

$p = a + f$

$p^2 = a^2 - f^2 = d^2$ $\quad$ $a^2 - f'^2 = e^2$

$f = f'$





$$U_1 + \frac{e}{r} = 0$$

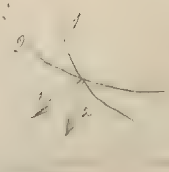
$$-4\pi\sigma = \frac{dU}{dq} - \frac{dU}{dq}\Big|_{q=0}$$

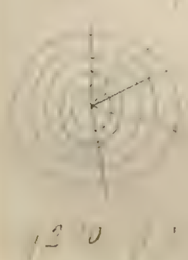
$$\frac{dU_r}{dq} = - \frac{dU}{dq}$$

$$= \frac{2h}{(f^2+h^2)^{\frac{3}{2}}}$$

$U = f \times 2$

$U = \text{const.}$





$$NL = dF' \cos\varphi$$

$$= q\, dF'$$

$$\frac{r}{4nm} = \ldots\, dF'$$

[illegible]

[illegible]

$$[\text{illegible}] = \iiint dx\,dy\,dz \cdot \mathfrak{g} \cdot \frac{d^2 u}{dx^2}$$

$$= \iint dy\,dz \int \frac{d^2 u}{dx^2}\,dx$$

$$\int \frac{d^2 u}{dx^2}\,dx = [\text{illegible}]$$

$$\iiint [\text{illegible}]\,dx\,dy\,dz =$$

$$= [\text{illegible}]$$

$$- \iiint [\text{illegible}]\,dx\,dy\,dz$$

[illegible]

$dy\,dz = dF \cos i$

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[illegible]

$= [illegible] \frac{dH}{dx} [illegible]$

[illegible]

$\iint [illegible] \frac{dH}{dx} dy\, dz = \iint [illegible] \frac{dH}{dx} \cos [illegible]\, dF$

$\iint [illegible] \frac{dH}{dy} dx\, dz = \iint [illegible] \frac{dH}{dy} \cos [illegible]\, dF$

$\iint [illegible] \frac{dH}{dz} dx\, dy = \iint [illegible] \frac{dH}{dz} \cos [illegible]$

$\iiint [illegible]\, dx\, dy\, dz = \iint \Big[[illegible] \frac{dH}{dx} \cos [illegible] + \frac{dH}{dy} \cos [illegible] + \frac{dH}{dz} \cos [illegible] \Big] dF$

$- \iiint \Big[[illegible] \Big] dx\, dy\, dz$

$\cos \lambda = \frac{dx}{dn} \quad \cos [illegible] = \frac{dy}{dn} \quad \cos [illegible] = \frac{dz}{dn}$

$\frac{dH}{dx} \cos [illegible] + [illegible] = \frac{dH}{dx} \frac{dx}{dn} + [illegible] = \frac{dH}{dn}$

$\iiint \mathfrak{z} \left(\frac{d^2H}{dx^2} + \frac{d^2H}{dy^2} + \frac{d^2H}{dz^2} \right) dx\, dy\, dz = \iint \mathfrak{z} \frac{dH}{dn}\, dF - \iiint \Big[\frac{d\mathfrak{z}}{dx} \frac{dH}{dx} + \frac{d\mathfrak{z}}{dy} \frac{dH}{dy} + \frac{d\mathfrak{z}}{dz} \frac{dH}{dz} \Big] dx\, dy\, dz$

[illegible]

I).

[illegible]

II [illegible]

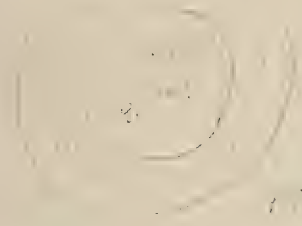
$-4\pi \iiint [illegible] \, dx\,dy\,dz = [illegible] \, dF - \iiint [illegible]$

[illegible]

$0 = [illegible] - \iiint [illegible] \, dx\,dy\,dz$

[illegible]

$\frac{dU}{dx} = [illegible]$ [illegible]



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III

A.

$$\frac{d\frac{1}{r}}{dx} = -\frac{1}{r^2}\frac{dr}{dx} \qquad r^2 = x - a \ldots$$

$$r\frac{dr}{dx} = x - a$$

$$\frac{d\frac{1}{r}}{dx} = -\frac{1}{r^2}\,\frac{x-a}{r}$$

$$-4\pi \ldots = \ldots \frac{dU}{dn} + \int \frac{1}{r}\left[\frac{dU}{dx}\,x-a \ldots\right.$$

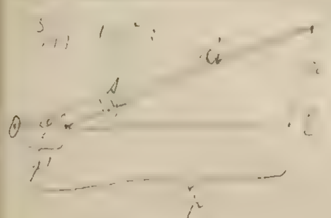
$$\left. + \frac{dU}{dz}\,\frac{z-c}{r}\right]$$

$$\frac{dU}{dx}$$

$$\frac{x-a}{r}$$

I

$U_0 = -\frac{1}{4\pi}\int\int$ [illegible]

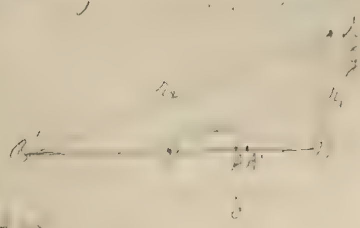


$U = \frac{e}{r} - \frac{e'}{r'}$

$\frac{e}{r} = \frac{e'}{r'}$

$e^2 r'^2 = e'^2 r^2$

$$\sigma = -\frac{1}{4\pi} \ldots$$



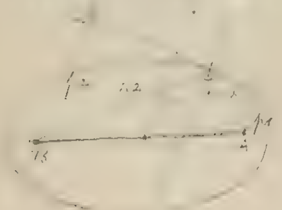
$$= -\mu \, l \left(\sqrt{(x-c)^2 + y^2} - x - c\right) + \mu \, l \left(\sqrt{(x+c)^2 + y^2} \ldots\right)$$

[illegible]

$$\frac{dU}{dn} = [illegible] = -\frac{2m \ldots}{\ldots}$$

$$= -\frac{2mc\cos\varphi}{r^2} \qquad [illegible]$$

[illegible]



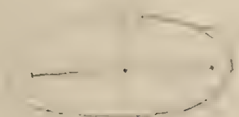
$p = p' \ldots = \ldots\cos\varphi$

$$\frac{dU}{dn} = -\frac{2mc\,p}{r\,b^2} \qquad [illegible]$$

[illegible]

$$r = \frac{e\,p}{\ldots\,b^2} = \frac{\ldots}{2K} \qquad [illegible]$$

[illegible]



[illegible]

$$U = \frac{\overbrace{2cm}^{e}}{r_c}\, l\,\frac{\ldots}{\ldots} = \frac{e}{c}\, l\,\frac{a+c}{\ldots} = \frac{e}{c}\, l\,\frac{a+c}{b} = e\,Z = P$$

[illegible]

IX

$$\frac{\varphi}{2} = \psi$$

$$\mathfrak{P} = 2 \ldots l \frac{8a}{\rho}$$

$$= \frac{q}{\pi a} l \frac{8a}{\rho} \qquad q = \frac{\pi a}{l \frac{8a}{\rho}} \mathfrak{P} \qquad C = \frac{\pi a}{l \frac{8a}{\rho}}$$

[illegible]

$a + c$ [illegible]

[illegible]

$\frac{\sigma\, ds}{r^2}$ [illegible]

$\frac{\sigma\, ds'}{r'^2}$ [illegible]

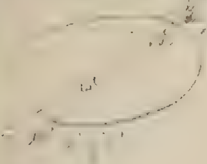
[illegible] ω [illegible] $\cos\alpha$ [illegible]

$r'^2 =$ [illegible]

[illegible]

$\frac{\sigma\, ds}{r^2} = \frac{\sigma\, r^2 \omega}{r^2 \cos\alpha}$

$\frac{\sigma\, ds'}{r'^2} = \frac{\sigma\, r'^2 \omega}{r'^2 \cos\alpha}$



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$F(x, y, z) = \ldots$

$\cos\alpha = \dfrac{\frac{\partial F}{\partial x}}{\sqrt{\left(\frac{\partial F}{\partial x}\right)^2 + \left(\frac{\partial F}{\partial y}\right)^2 + \left(\frac{\partial F}{\partial z}\right)^2}}$

$\cos\alpha = \dfrac{x-a}{\ldots}$

$\cos\alpha = \dfrac{x-x'}{\sqrt{(x-x')^2+(y-y')^2+(z-z')^2}}$

$\cos\varphi = \cos\alpha\cos\lambda + \cos\beta\cos\mu + \cos\gamma\cos\nu$

$F = \dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$

$\dfrac{\partial F}{\partial x} = \dfrac{2x}{a^2}$ $\quad \dfrac{\partial F}{\partial z} = \dfrac{2z}{c^2}$

$\dfrac{\partial F}{\partial y} = \dfrac{2y}{b^2}$

$$= \frac{x}{a} \cdot \frac{1}{\sqrt{\frac{x^2}{a^4} + \frac{y^2}{b^4} + \frac{z^2}{c^4}}}$$

$$\cos\varphi = p \cdot \frac{\frac{(x-x')x}{a^2} + \dots}{\sqrt{\dots}} =$$

$$\cos\varphi' = p' \dots = \frac{x'-x}{\sqrt{\dots}} \cdot \frac{p' x'}{a^2} + \dots$$

$\cos\varphi : \cos\varphi' = p : p' = 6 : 6'$

[illegible]

$$\int \frac{\rho\, d\sigma}{r} = \frac{\epsilon}{3d} \int \frac{\rho\, d\sigma}{r}$$

[illegible]

$$d\sigma = r^2 \sin\theta\, d\theta\, d\phi \qquad x = r\cos\theta$$

$$y = r\sin\theta\cos\phi$$

$$z = r\sin\theta\sin\phi$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

$$r^2\left[\frac{\cos^2\theta}{a^2} + \frac{\sin^2\theta\cos^2\phi}{b^2} + \frac{\sin^2\theta\sin^2\phi}{c^2}\right] = 1$$

$$\int \rho \frac{d\sigma}{r} = \iint \frac{\sin\theta\, d\phi\, d\theta}{\frac{\cos^2\theta}{a^2} + \frac{\sin^2\theta\cos^2\phi}{b^2} + \frac{\sin^2\theta\sin^2\phi}{c^2}}$$

[illegible] $b = c$

$$\int \ldots = 2\pi \int_0^{\frac{\pi}{2}} \frac{\sin \theta \, d\theta}{[illegible]}$$

$$= \ldots \int \frac{[illegible]}{[illegible]} = \ldots \int_0^{\frac{\pi}{2}} \frac{\sin \theta \, d\theta}{\frac{1}{b^2} + \left(\frac{1}{a^2} - \frac{1}{b^2}\right) \ldots}$$

[illegible]

$$= \ldots \int_1^0 \frac{d\ldots}{[illegible]} = \ldots \int_0^1 \frac{d\ldots}{1 + [illegible]}$$

$$= \frac{4\pi \ldots^2}{\sqrt{\ldots - 1}} \left[\tan^{-1} \left(\ldots \sqrt{\ldots - 1} \right) \right]_0^1$$

$$= \frac{\ldots}{\sqrt{\ldots}} \tan^{-1} \sqrt{\ldots - 1}$$

$$U = \frac{\ldots}{\ldots} \frac{\ldots}{\sqrt{\ldots - 1}} \tan^{-1} \sqrt{\ldots} = \frac{\ldots}{\sqrt{\ldots}} \tan^{-1} \sqrt{\ldots}$$

$E = C i l$

$$C = \frac{\sqrt{\ldots}}{\ldots \tan^{-1} \sqrt{\frac{\ldots}{a^2} - 1}} \qquad C = \frac{\ldots \sqrt{\ldots - 1}}{\ldots} = a$$

[illegible]

$$C = \frac{b}{\frac{\pi}{2}} = \frac{2b}{\pi} \ldots [illegible]$$

[illegible]

$$\sigma' = [illegible] = \frac{\Sigma}{[illegible]} = [illegible]$$

$\sigma = \frac{\Sigma\, \rho}{4\pi [illegible]}$

$$\sigma' = \frac{\Sigma\, a^2}{4\pi [illegible]\, \rho^2} = \frac{\Sigma\, a}{[illegible]\, x} = [illegible]$$

$$= \frac{\Sigma}{[illegible]} \frac{[illegible]}{[illegible]}$$

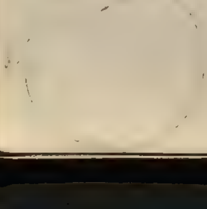
[illegible]

$$\sigma_1 = \frac{\Sigma}{[illegible]} \frac{1}{[illegible]}$$

$$\sigma_1 = \frac{\Sigma}{[illegible]} =$$

[illegible]

$\ell \cdot \mathcal{C} \cdot \ell \cdot \zeta = \infty$



[illegible]

$$\frac{m}{r} = \frac{m_1}{r_1}$$

$$C_1 = \frac{2C}{\pi}$$

$$= \frac{2C}{\sqrt{1 - \frac{\pi^2}{4}}} = 2\pi a$$

Capacität

$$U = 2\pi\sigma \sin\theta \, d\theta = 2 a \pi \sigma \pi$$

$$U = \frac{2\pi a \pi \sigma}{} = \pi$$

$$\frac{2b}{\pi} = \text{Capacität}$$

Proof. Vol. Ods : Vol Ods' =
$h^3 : abc$ =
$= h\,ds : p\,ds'$

$$\sigma' = \sigma \frac{ds}{ds'} = \sigma \frac{h^2 p}{abc}$$

$$= \frac{E p}{4\pi abc} \quad !!!$$

$$\sigma h = \frac{\sigma' abc}{h p}$$

$$\sigma' = \sigma \frac{h^2 p}{abc} = \frac{\sigma \, E \, p}{4\pi abc}$$

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$= \dots$

$dx \qquad \frac{dx}{2x}$

$\xi^2 = \alpha x$

$x^2 + y^2 + z^2 = a^2$

$x^2 + y^2 + z^2 = (a+\varepsilon)^2$

$\xi = $ [illegible] $\quad \frac{\xi^2}{}$ [illegible] $= h$

$\xi = $ [illegible] $\quad \frac{\xi^2}{}$ [illegible] $= h$ [illegible]

$6 = $ [illegible]

$a = $ [illegible] $\quad a' = $ [illegible]

$b = $ [illegible] $\quad b' = $ [illegible]

$c = $ [illegible] $\quad c' = $ [illegible]

$a' : a = $ [illegible]

[illegible]

[illegible]

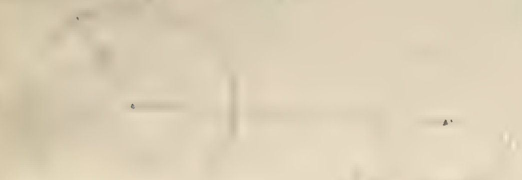
[illegible]

$\frac{x}{r} = \frac{x'}{r'} \qquad \frac{y}{r} = \frac{y'}{r'} \qquad \frac{z}{r} = $ [illegible]

$x' = \frac{x r'}{r} = \frac{x r' r}{r^2} = $ [illegible] $\qquad x = $ [illegible] $= \frac{r^2 x'}{r'}$ [illegible]

$x = x$ $\qquad y^4 = \frac{a^2 x^4}{r^2} = \frac{a^2}{r^2}$

$(x - x_1)^2 + y^2 + z^2 = \rho^2$



$= \frac{a^4}{r^2\rho^2}\left[r^2 + \ldots\right]$

$\rho' = \frac{a^2}{r\rho}$ $\qquad = \frac{a^4}{r^2\rho^2}\,\rho^2$

[illegible] $= \frac{e}{?}$

[illegible]

[illegible] $\varphi' = \frac{e'}{r}$

$= \frac{e' r\ldots}{r\ldots}$ [illegible]

[illegible] $e' = e\,n$

$\varphi' = \frac{1\,?}{n}$ $\qquad$ $l' = \ldots = \frac{1}{?}\,U$ [illegible]

[illegible]

[illegible]

26/11 [illegible]

[illegible]

$$x' = \frac{x\,r'}{r} = \frac{h^2 x}{r^2}$$

$$dx' = \frac{h^2}{r^2}\,dx - \frac{2h^2 x}{r^3}\,dr \qquad dy' = \frac{h^2}{r^2}\,dy - \frac{2h^2 y}{r^3}\,dr$$

$$dz' = \frac{h^2}{r^2}\,dz - \frac{2h^2 z}{r^3}\,dr$$

$$dx'^2 + dy'^2 + dz'^2 = ds'^2 = \frac{h^4}{r^4}\,ds^2 - \frac{4h^4}{r^5}(x\,dx + y\,dy + z\,dz)\,dr$$

$$+ \frac{4h^4}{r^6}(x^2 + y^2 + z^2)\,dr^2$$

[illegible]

[illegible]

$\cos\alpha' = \cos\alpha - \frac{2x}{r}\cos\varphi$

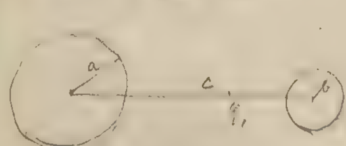
$\cos\alpha_1' = \cos\alpha_1 - \frac{2x}{r}\cos\varphi_1$

$\cos\alpha'\cos\alpha_1' = \cos\alpha\cos\alpha_1 - \frac{2x}{r}(\cos\alpha\cos\varphi_1 + \cos\alpha_1\cos\varphi) + \frac{4x^2}{r^2}\cos\varphi\cos\varphi_1$

[illegible]

$\cos\vartheta' = \cos\vartheta -$ [illegible]

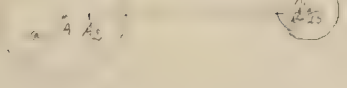
[illegible]



a
c
b

[illegible]

27/11



$\mathfrak{E}_1 = -\frac{\mathfrak{E}\, b}{AB}$ [illegible]

$\overline{A_1 B} \cdot \overline{AB} = r^2$ [illegible] $\mathfrak{E}_2$

$\mathfrak{E}_2 = -\frac{\mathfrak{E}_1\, r}{A_1 A}$ $\quad AA_2 \cdot AA_1 = r^2$

[illegible]

$\varphi_1' = - \frac{\varphi'}{\ldots}$ [illegible]

$\varphi_2 = - \frac{\ldots}{A_1 B}$ [illegible]

[illegible]

$\varphi = \varphi' + \varphi_1 +$ [illegible]

[illegible]

$\varphi = \varphi + \varphi_2$

[illegible]

$A:\ \frac{\varphi\,\varphi'}{AB} - \ldots - \ldots$

$+ \frac{\varphi_2\,\varphi'}{A_2 B} - \ldots - \ldots$

$+ \frac{\varphi_1'\ldots}{A_1\ldots} +$

[illegible]

$A \quad B.\ \frac{\varphi\,\varphi'}{AB^2} + \frac{\varphi\,\varphi'}{A\ldots} + \frac{\varphi'\,\varphi_1'}{\ldots}$

$\varphi = \varphi_2 + \varphi_1'$

$\varphi' = \varphi' + \varphi_1$

[illegible]

$$\varphi = \frac{\varphi}{1-\frac{v}{c}}$$ [illegible]

[illegible]

$$\int_{r_2}^{r_1} \frac{m_1 m_2}{r^2}\, dr = A$$

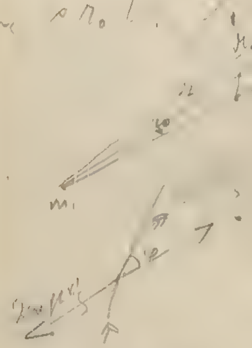
$$-\frac{m_1 m_2}{r}\Big|_{r_2}^{r_1} = A$$

$$A = -\frac{m_1 m_2}{r_1} + \frac{m_1 m_2}{r_2}$$

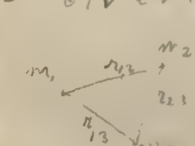
[illegible]

$\frac{m_1 m_2}{r_1}$

$V = \frac{m}{r}$



$A = -\int \frac{d}{ds}\left(\frac{m_1 m_2}{r}\right) ds = -\frac{m_1 m_2}{r}\Big|_{s_0}^{s_1} = -\frac{m_1 m_2}{r_1} + \frac{m_1 m_2}{r_0}$



$\frac{m_1 m_2}{r_{12}}$

$\frac{m_1 m_3}{r_{13}} + \frac{m_2 m_3}{r_{23}}$

$\frac{m_1 m_4}{r_{14}} + \dots$ etc.

$A =$

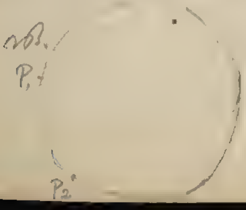
$2A =$

$2A = m_1$

$\left(\frac{m_2}{r_{12}}\right.$ $= P_1$

$\left(\frac{m_1}{r_{12}}\right.$ $= P_2$

$2A = m_1 P_1 + m_2 P_2$

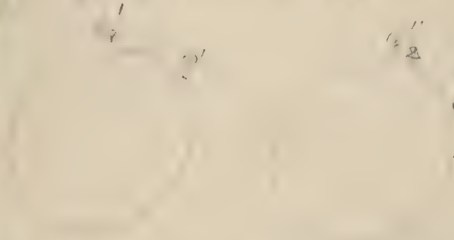


$2A =$ $P = \Sigma P$

$A = \frac{q\,r}{c}$

$A = \frac{r^2}{c}$

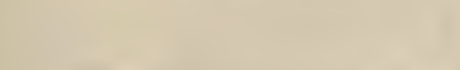
I



2/12

$\mu \overline{AC} = a^2$

I.



[illegible]

$$A = -\frac{1}{2}\,\frac{[illegible]}{p^2 - a^2} + \frac{1}{2}\,\frac{[illegible]}{p^2}$$ [illegible]

$$A' = A + \delta A = \ldots + \frac{dA}{dp}\,\delta p$$

A'' [illegible]

$\frac{d}{d}$ = [illegible]

[illegible]

$K = -$ [illegible]

[illegible]

$K = -$ [illegible] $+$ [illegible]

$= -$ [illegible]

[illegible]

$K = -$ [illegible] $-$ [illegible]

[illegible]

$\frac{dA}{ds}$ [illegible]

[illegible]

$\frac{dA}{ds} = -\frac{1}{2}$ [illegible] $+ \frac{q^2 a^2}{(r^2 - a^2)^2} + \frac{1}{2} \frac{q^2}{r^2}$

$\frac{dA}{ds}$ [illegible]

[illegible]

$A_1 A_2$

$$q_2 = -\frac{q_1 a}{A_1 A} \quad \ldots \quad q_1 = -\frac{q_1 a}{A_2 B} \quad \text{etc.}$$

$$q_1' = -\frac{q'_2}{c}$$

$$A_1 A = c - A_1 B$$

$$= c - \frac{b^2}{c}$$

$$B_1 A = c - \frac{a^2}{c}$$

$$A_1 B = c - \frac{a^2}{A_1 A} = c - \frac{a^2}{c - \frac{b^2}{c}} \qquad B_1 A = c - \frac{b^2}{c - \frac{a^2}{c}}$$

$$q_1 = -\frac{q\, b}{c} \qquad q_1' = -\frac{q' a}{c}$$

$$q_2 = +\frac{q\, b}{c}\,\frac{a}{c - \frac{b^2}{c}} \qquad q_2' = \frac{q' a}{c}\cdot\frac{b}{c - \frac{a^2}{c}}$$

$\varphi = P\alpha [\,1 + \ldots\,] - P' \ldots$

$\varphi' = P' \ldots [\,1 + \ldots\,] - \ldots$

Energie:

$A = \ldots$

$\varphi = \alpha P - \gamma P'$

$\varphi' = \ldots P' - \gamma P$

$P = \frac{\ldots + \gamma \ldots}{\ldots - \gamma^2}$

$P' = \frac{\ldots}{\ldots - \gamma^2}$

$A = \frac{1}{2} \frac{1}{\alpha \ldots - \gamma^2} \left[\ldots \varphi^2 + \alpha \varphi'^2 + 2\gamma \varphi \varphi' \right]$

$\alpha = a \left[1 + \frac{\ldots}{c^2} \right]$

$\ldots = b \left[1 + \frac{\ldots}{c^2} \right] \quad \mu = \frac{\ldots}{c}$

$$= ab\left[1 + \frac{\cdot}{2}\right]$$

$$= \frac{ab}{c^2}$$

$$3 \ldots = ab\left[1 + \ldots\right]$$

$$A = \frac{1}{2ab\left[1-\frac{ab}{c^2}\right]}\left[\ldots\right]$$

$$= \frac{\mathfrak{L}^2}{2a} + \frac{\mathfrak{L}'^2}{2b} + \frac{\ldots}{c\left[1-\ldots\right]}$$

$$A = \frac{\mathfrak{L}^2}{2a} + \frac{\mathfrak{L}'^2}{2b} + \mathfrak{L}\mathfrak{L}'\left[\frac{1}{c} - \ldots\right]$$

$$\frac{dA}{dc} = \mathfrak{L}\mathfrak{L}'\left[-\frac{1}{c^2} + \ldots\right]$$

$$-\frac{dA}{dc} = \ldots \frac{\ldots}{c^2\left[1-\frac{3\ldots}{c^2}\right]}\left[1 - \ldots\right]$$

$b = 2 \ldots \quad c = 10a \ldots = \frac{3}{100}$

$b \ldots c \, 6 \ldots \text{Corr.} = \frac{1}{100}$

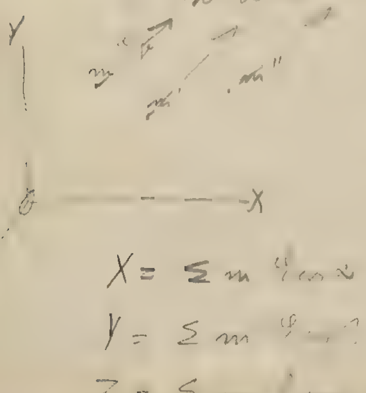
9/12 Magnetism ...

[illegible]

[illegible]

$$= \mathfrak{E}$$

$$= m\,\mathfrak{E}$$



$m\,\mathfrak{E}\cos x =$ [illegible]

$m'\,\mathfrak{E}\cos$ [illegible]

Z

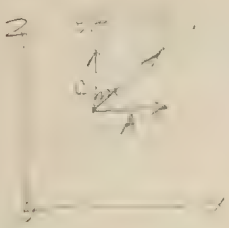
$$X = \Sigma\, m\,\mathfrak{E}\cos x$$

$$Y = \Sigma\, m\,\mathfrak{E}\cos y$$

$$Z = \Sigma\, m\,\mathfrak{E}\cos z$$

ΣX [illegible]

$\Sigma m = 0$



$A = m \ldots$

$C = m \ldots$

$\underline{\Sigma}\, m \ldots - m \ldots$

$\Sigma m z - \ldots \Sigma m \ldots$

$\ldots \Sigma m x - \ldots \Sigma m y$

X. $\ldots \Sigma m y - \ldots \Sigma m z$

$\Sigma m \ldots = \ldots$

$\Sigma m x = A$

$\underline{\Sigma} m y = B$

$\Sigma m z = C$

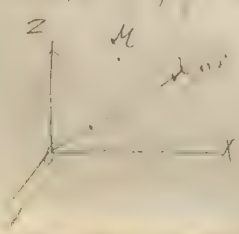
$x' = x - a$

$\Sigma m x' = \Sigma m (x - a)$

$= \Sigma m x - \Sigma m a$

$= \Sigma m x - a \Sigma m$

$= \Sigma m x$



L

$l = x \ldots + y \ldots$

$\Sigma m l = m \ldots$

$= \ldots \Sigma m \ldots \Sigma m y \ldots$

Σm [illegible]

[illegible]

Σm [illegible] $= M$ [illegible]

[illegible]

$= M \cos\theta$

[illegible]

$M =$ [illegible]

[illegible]

$M =$ [illegible]

[illegible]

$A = \Sigma$ [illegible] $= \Sigma m'\xi' - \Sigma m''\xi''$

$\xi_1 = \dfrac{\Sigma m'\xi'}{\Sigma m'}$ $\qquad \xi_2 = \dfrac{\Sigma m''\xi''}{\Sigma m''}$

$A = \xi_1 \Sigma m' - \xi_2 \Sigma m''$ $\qquad \Sigma m' = \Sigma m''$

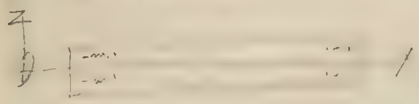
$A = (\xi_1 - \xi_2)\Sigma m'$

$B = (\eta_1 - \eta_2)\Sigma m'$ $\qquad C = (\zeta_1 - \zeta_2)\Sigma m'$

[illegible] = [illegible]

[illegible]

[illegible]



[illegible]

$C = \Sigma m z$ [illegible]

$= mz - mz$ [illegible]

$= 0$ [illegible]

[illegible]

[illegible] $= M$

[illegible]

[illegible] $\Sigma m z - \Sigma \cos\psi \cdot \Sigma m x$

$= \Sigma \cos\varphi \cdot B - \Sigma \cos\chi \cdot C$

$= \Sigma M \cos\varphi \cdot b -$ [illegible]

$= \Sigma M \cos\varphi \cdot b -$ [illegible]

[illegible] $= 0$ [illegible]

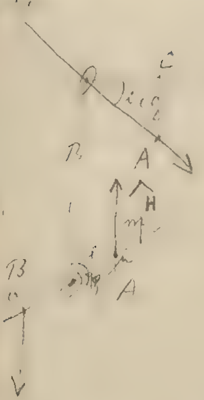
$\cos\varphi \cos c - \cos\psi \cos b = 0$ [illegible]

[illegible] $= 0$ [illegible] X [illegible]

[illegible]

$OC = \mathcal{Q}\cos i = H$ ...

$OB = \mathcal{Q}\sin i = V$ ...



$mH =$ ...

$H\frac{\Sigma m'}{r} = \ldots H$

$\ldots H \cdot OA + \ldots H \cdot O\ldots = \ldots$

$\ldots H\ AB =$

$m\ldots \sin\varphi$

$-\mu t \ldots$

$-\mu \ldots$

$-M H \sin\varphi$

$= MV\cos\varphi$

$-M H \sin\varphi + MV\cos\varphi = 0$

$H \sin\varphi = V\cos\varphi$

$\mathfrak{E} \ldots \sin\varphi = \mathfrak{E} \sin i \ldots$

$\operatorname{tg}\varphi = \operatorname{tg} i$

$\therefore \varphi = i$

$-p \ldots$

$-MH\sin\varphi + MV\cos\varphi - p \ldots = 0$

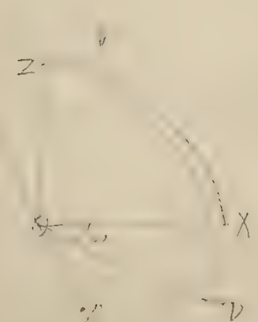
$-M \ldots + M\,\mathfrak{E} \ldots \sin i - p \ldots = 0$

$\operatorname{tg}\varphi = \dfrac{M \ldots - p \ldots}{M \ldots} =$

$= \operatorname{tg} i - \dfrac{p \ldots}{M \ldots}$

Z

$H \sin\varphi + VH \cos\varphi = 0$



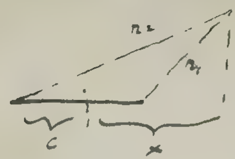
$= \frac{E \sin i}{F}$

$\cos\omega \doteq 1$

$\omega = 0$

$-uH \ldots + \ldots = 0$

$-H \sin\varphi$



$$U = \mu \lg \frac{r_2+x+c}{r_1+x-c}$$

$$r_1^2 = (x-c)^2 + y^2$$
$$r_2^2 = (x+c)^2 + y^2$$
$$r_2^2 - r_1^2 = 4cx$$

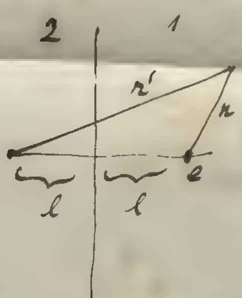
$$= \mu \lg \frac{4cr_2 + r_2^2 - r_1^2 + 4c^2}{4cr_1 + r_2^2 - r_1^2 - 4c^2}$$

$$= \mu \lg \frac{(r_2+2c)^2 - r_1^2}{(r_1-2c)^2 + r_2^2} = \mu \lg \frac{r_1+r_2+2c}{r_1+r_2-2c}$$

$$\frac{r_2+x+c}{r_1+x-c} \qquad \frac{r_1-x+c}{r_2+x-c}$$

str. patrz Stefan

Punkt elektr. przed niesk. dielektrykiem!



$$U_1 = \frac{e}{r} - \frac{K-1}{K+1}\, e\, \frac{1}{r'}$$

$$U_2 = \frac{2}{K+1}\,\frac{e}{r}$$

Spełnia warunki powierz. dla $r = r'$

$$U_1 = U_2$$

$$\frac{\partial U_1}{\partial x} = K \frac{\partial U_2}{\partial x}$$

więc przyciąganie punktu e ku płaszczyźnie $= \dfrac{K-1}{K+1}\,\dfrac{e^2}{4l^2}$

uzupełnienie

potencyał dipozyt. elekt. ~~[illegible]~~ wydłużonej:

$$U = \frac{E}{2ab^2}\int\frac{\sin\theta\,d\theta}{\frac{1}{a^2}+\left(\frac{1}{a^2}-\frac{1}{b^2}\right)\cos\theta} = \frac{E}{2ab}\log\frac{1+\sqrt{\frac{b^2}{a^2}-1}\,\cos\theta}{1+\sqrt{(\quad)}\cos\theta}\Bigg|_0^1 = \frac{E}{\;}\log\frac{a+\sqrt{b^2-a^2}}{a+\sqrt{--}}$$

$$\int\frac{d\alpha}{\cos\alpha} = \int\frac{d\sin\alpha}{1-\sin^2\alpha} = \log\frac{1+\sin\alpha}{1+\sin\alpha}\Bigg|$$

$$\cancel{\log\frac{\sin\alpha+\sqrt{1-\sin^2\alpha}}{\sin\alpha-\sqrt{\;}}}$$

$$\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha} =$$

$$\frac{1+\sin\alpha_2}{1-\sin\alpha_2}\cdot\frac{1-\sin\alpha_1}{1+\sin\alpha_1} \qquad \int\frac{d\alpha}{\sin\alpha} = \int\frac{d\cos\alpha}{1-\cos^2\alpha}$$

Pojemność drutu prostolinijnego:

$$C = \frac{l}{2\log\frac{l}{\rho}}$$

$$\operatorname{arctg}(\alpha+i\beta) = x+iy$$

$$\cancel{\alpha+i\beta = \operatorname{tg}(x+iy)}$$

$$= \frac{\operatorname{tg}x + \frac{e^{-y}-e^{y}}{e^{-y}+e^{y}}}{1-\operatorname{tg}x\cdot\frac{e^{-y}-e^{y}}{e^{-y}+e^{y}}}$$

$$C = \frac{\sqrt{a^2-b^2}}{\log\sqrt{\frac{a^2+\sqrt{a^2-b^2}}{a^2-\sqrt{a^2-b^2}}}}$$

$$= \frac{2\sqrt{a^2-b^2}}{\log\frac{2}{\left(1-\frac{b^2}{a^2}\right)}} :$$

$$C = \frac{\sqrt{b^2-a^2}}{\operatorname{arctg}\sqrt{\frac{b^2}{a^2}-1}} = \frac{i\sqrt{a^2-b^2}}{\operatorname{arctg} i\sqrt{1-\frac{b^2}{a^2}}}$$

$$\operatorname{arctg} i\varphi = xi$$

$$i\varphi = \operatorname{tg}xi \qquad \frac{e^{-x}-e^{x}}{i\left(e^{-x}+e^{x}\right)}$$

$$\varphi = \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}}$$

$$e^{2x}\varphi + \varphi = e^{2x}-1$$

$$e^{2x} = \frac{1+\varphi}{1-\varphi}$$

$$x = \frac{1}{2}\log\frac{1+\varphi}{1-\varphi}$$

II. III S. 91/92

Dr. Josef Stefan

Magnetismus u. Elektricität

M. Smoluchowski

10

[illegible]

$\frac{d^2\varphi}{dt^2} = -\frac{M\mu}{\ldots}$ [illegible]

$= -\frac{M\mu\pi c}{\ldots}\varphi + \frac{\alpha}{\ldots} - \frac{1}{\ldots}$ [illegible]

$\frac{M\mu\pi c}{\ldots} = a^2 \qquad \frac{1}{\ldots} = 2b$

$\varphi = \varphi_0 + u$ [illegible]

[illegible] $= -a^2\varphi_0 - a^2u$ [illegible]

$-a^2\varphi_0 - \ldots =$ [illegible]

[illegible]

$\frac{d^2u}{dt^2} = -a^2u - 2b\frac{du}{dt}$

$\frac{d^2u}{dt^2} + 2b\frac{du}{dt} + a^2u = 0 \qquad u = Ae^{\lambda t}$

$\frac{du}{dt} = A\lambda e^{\lambda t}$

$Ae^{\lambda t}\left[\lambda^2 + 2b\lambda + a^2\right] = 0 \qquad \frac{d^2u}{dt^2} = A\lambda^2 e^{\lambda t}$

[illegible]

[illegible]

$\lambda^2 + 2b\lambda + a^2 = 0$ [illegible]

$\lambda = -b \pm \sqrt{b^2 - a^2}$

$u = e^{-bt}\left[Ae^{t\sqrt{b^2-a^2}} + Be^{-t\sqrt{b^2-a^2}}\right]$

[illegible]

$b < a$

$\sqrt{a^2 - b^2} = c$ $\quad u = e^{-bt}\left[A e^{ict} + B e^{-ict}\right]$

$u = e^{-bt}\left[(A+B)\cos ct + i(A-B)\sin ct\right]$

$A + B = \mathcal{B} \quad i(A-B) = \mathcal{A}$

$u = e^{-bt}\left[\mathcal{B}\cos ct + \mathcal{A}\sin ct\right]$

[illegible]

$\frac{du}{dt} = -b\,e^{-bt}\left[\mathcal{B}\cos ct + \mathcal{A}\sin ct\right] + e^{-bt}\left[-c\,\mathcal{B}\sin ct\right.$
$\left. + c\,\mathcal{A}\cos ct\right]$

$t = 0 \quad u = U_0$ [illegible]

$\frac{du}{dt} = 0$

$u = U_0 = \mathcal{B} \qquad \frac{du}{dt} = 0 = -b\,\mathcal{B} + c\,\mathcal{A}$

$\mathcal{A} = \frac{b\,\mathcal{B}}{c} = \frac{b\,U_0}{c}$

$u = U_0\, e^{-bt}\left[\cos ct + \frac{b}{c}\sin ct\right]$

$\frac{du}{dt} = e^{-bt}\sin ct\left[\ldots\right]$

$= -e^{-bt}\sin ct\,\frac{b^2 + c^2}{c}\,U_0$

$= -e^{-bt}\sin ct\; U_0\,\frac{a^2}{c}$

$t_1 \quad \ldots = 0 \quad ct_1 = \pi$

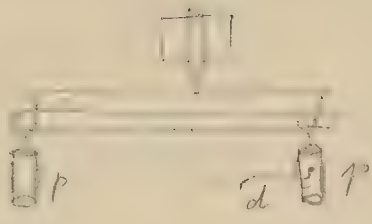
$t_2 \qquad\qquad ct_2 = 2\pi$

$\tau = \pi\sqrt{\frac{K}{MH}}$

$\tau' = \pi\sqrt{\frac{K+k}{MH}}$

$\tau^2 = \frac{\pi^2 K}{MH}$

$\tau'^2 = \frac{\pi^2(K+k)}{MH}$



$\tau'^2 - \tau^2 = \frac{\pi^2 k}{MH}$ $\qquad \frac{\tau'^2-\tau^2}{\pi^2 k} = \frac{1}{MH}$

$pd^2 + \frac{p}{2} r^2$

$k = 2pd^2 + pr^2$

[illegible] $M'H$

$K\frac{d^2\varphi}{dt^2} = -HM\varphi + \alpha(f-\varphi) - \beta\frac{d\varphi}{dt}$

$\frac{d\varphi}{dt} = 0 \quad \frac{d^2\varphi}{dt^2} = 0$

$0 = -HM\varphi + \alpha(f-\varphi)$

$= -(HM+\alpha)\varphi + \alpha f$

$\varphi = \frac{\alpha f}{HM+\alpha} = \frac{f}{1+\frac{HM}{\alpha}}$ [illegible]

[illegible] $\frac{HM}{\alpha}$

[illegible]

$HM + \ldots$ [illegible]

$(HM+\alpha)(p+\vartheta) = \alpha f + u$ [illegible]

$(HM+\alpha)\, v = \alpha u$

[illegible]

$$\tau = \frac{T}{2}$$

$$u_1 = -U_0 e^{-\delta\tau}$$

$$u_2 = U_0 e^{-2\delta\tau}$$

$$u_3 = -U_0 e^{-3\delta\tau}$$

$$u_{10} = U_0 e^{-10\delta\tau}$$

$$\frac{U_0}{u_{10}} = e^{10\delta\tau}$$

$$P = \sum \frac{m}{\sqrt{(\xi - x)^2 + (\eta - y)^2 + (\zeta - z)^2}}$$

[illegible]

$$P = \frac{1}{R} \sum \frac{m}{\sqrt{1 - \frac{2(x\xi + y\eta + z\zeta)}{R^2} + \frac{x^2 + y^2 + z^2}{R^2}}}$$

$$= \frac{1}{R} \sum m \left[1 + \frac{1}{2} \frac{2(x\xi + y\eta + z\zeta)}{R^2} - \frac{1}{2} \frac{x^2 + y^2 + z^2}{R^2} + \frac{3}{8} \left\{ \frac{-2(x\xi + y\eta + z\zeta)}{R^2} + \frac{x^2 + y^2 + z^2}{R^2} \right\}^2 - \cdots \right]$$

$$= \frac{1}{R} \sum m + \frac{1}{R^3} \left[\sum m (x\xi + y\eta + z\zeta) - \cdots - \sum m (x^2 + y^2 + z^2) \right] + \cdots$$

$$P = \frac{1}{R^3} \left[\xi \sum mx + \eta \sum my + \zeta \sum mz \right] \cdots$$

[illegible]

$P = \frac{A\xi + \ldots}{R^{?}}$

$A = \ldots$

$P = \frac{\ldots \xi}{R^{3}} \left[\ldots \right]$

$R^2 = \xi^2 + \ldots$

$X = \ldots$

$= -\frac{\partial \Phi}{\partial \xi}$

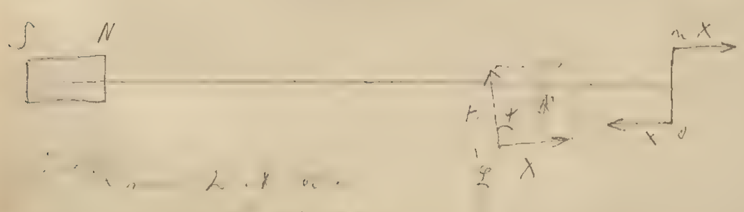
$= -\frac{M}{R^3} - \ldots$

$= -\frac{M}{R^3} + \ldots \frac{M \xi^2}{R^5}$

$Y = -\left[\frac{M}{\xi^3} - 3 \frac{M}{\xi^3} \right] = + 2 \frac{M}{\xi^3}$

$Z = Y = 0$

Magnetism



[illegible]

$\frac{L}{[illegible]} = \frac{\xi^3 \operatorname{tg}\varphi}{2}$

[illegible]

$\operatorname{tg} [illegible] = \frac{h}{\Delta}$

[illegible]

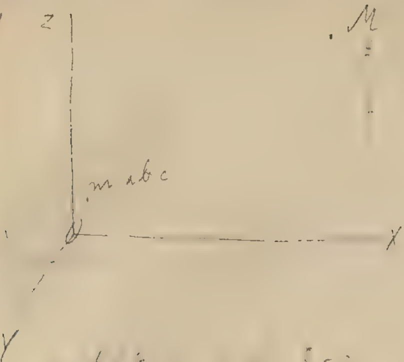
$\operatorname{tg}\varphi = \frac{2M}{\xi^3 H}$

$M : M' = [illegible]$

$\operatorname{tg}\varphi' = \frac{2M'}{\xi^3 H}$

[illegible]

7/1 [illegible]



[illegible]

$$= f(\xi [illegible]$$

$$= f(\xi [illegible]) - \frac{\partial f}{\partial \xi} a - \frac{\partial f}{\partial \eta} b - \frac{\partial f}{\partial \zeta} c +$$

$$+ \frac{1}{1.2} \Big[\frac{\partial^2 f}{\partial \xi^2} a^2 + \frac{\partial^2 f}{\partial \eta^2} b^2 + \frac{\partial^2 f}{\partial \zeta^2} c^2 + 2 \frac{\partial^2 f}{\partial \xi \partial \eta} ab +$$

$$+ 2 [illegible] + 2 \frac{\partial^2 f}{\partial \eta \partial \zeta} bc \Big] - [illegible]$$

$f = \frac{1}{[illegible]}$

[illegible] $= \Sigma \frac{1}{[illegible]} =$

$$= f(\xi [illegible]) - \frac{\partial f}{\partial \xi} \Sigma m a - \frac{\partial f}{\partial \eta} \Sigma m b - \frac{\partial f}{\partial \zeta} [illegible] +$$

[illegible]

$M = \Sigma m a$ $\Sigma m b = 0$ [illegible]

$P = - M \frac{\partial f}{\partial \xi}$ [illegible]

$$= - \frac{M \xi}{R^3}$$

$\Sigma m a^2$ [illegible]

$\Sigma m b^2 = 0$ $\Sigma m c^2 = 0$

Σm [illegible]

$\Sigma m a^2 = N$

$\Sigma m a b^2 = N' \quad \Sigma m a^3 = N'$

$$P = -M\frac{\partial f}{\partial \xi} - \frac{1}{2}\Big[N\frac{\partial^2 f}{\partial \xi^2} - 3N'\frac{\partial^3 f}{\partial \xi \partial \eta^2} - 3N'\frac{\partial^3 f}{\partial \xi \partial \zeta^2}\Big]$$

$$f = \frac{1}{\sqrt{\xi^2+\eta^2+\zeta^2}}$$

$$\frac{\partial f}{\partial \xi} = -\frac{1}{R^2}\frac{dR}{d\xi} = -\frac{\xi}{R^3}$$

$$\frac{\partial^2 f}{\partial \xi^2} = -\frac{1}{R^3} + 3\frac{\xi^2}{R^5}$$

$$\frac{\partial^3 f}{\partial \xi^3} = +3\frac{\xi}{R^5} + 6\frac{\xi}{R^5} - 15\frac{\xi^3}{R^7}$$

$$\frac{\partial^2 f}{\partial \eta^2} = -\frac{1}{R^3} + 3\frac{\eta^2}{R^5}$$

$$\frac{\partial^3 f}{\partial \xi \partial \eta^2} = \frac{3\xi}{R^5} - 15\frac{\eta^2 \xi}{R^7} \quad \Big| \quad \frac{\partial^3 f}{\partial \xi \partial \zeta^2}$$

$U = -M\left[\frac{\partial^2 f}{\partial \xi^2} \ldots\right]$

$f = \frac{1}{\ldots} = \frac{1}{r}$ $\frac{\partial f}{\partial \xi} = -\frac{\xi}{r^3}$ $\frac{\partial^2 f}{\partial \xi^2} = -\frac{1}{r^3} + \frac{3\xi^2}{r^5}$

$U = -M\Big[-$ [illegible] $\Big]$

$= \frac{M}{\cdot}\Big[$ [illegible] $\Big]$

[illegible]

[illegible]

$A = $ [illegible]

[illegible]

$P = -M\,\frac{\partial f}{\partial \xi} - \frac{N}{\cdot}$ [illegible]

$U = -M\Big[\frac{\partial^2 f}{\partial \xi^2}A' - $ [illegible] $\Big] - \frac{N}{\cdot}\Big[$ [illegible]

$+ \frac{\partial^2 f}{\partial \xi\,\partial \eta}$ [illegible] $+ \frac{\partial^2 f}{\partial \xi\,\partial \eta}$ [illegible] $\Big]$

[illegible]

[illegible]

$- \, N \, [illegible]$

$= [illegible]$

$[illegible] = \frac{9}{R} [illegible] - [illegible]$

$[illegible] = \frac{9}{R} - 90 [illegible] + [illegible]$

$\xi = R$

$[illegible] = \frac{2}{R}$

[illegible]

$= 12 [illegible] - [illegible]$

$M [illegible] = [illegible] + [illegible]$

$tg\,\varphi = [illegible] + [illegible]$

[illegible]

12/1 [illegible]

[illegible] $dx\,dy\,dz$ [illegible]

$\mu\, dx\, dy\, dz$

$\mu =$ [illegible]

α [illegible] = Comp. [illegible]

$\alpha\, dx\, dy\, dz =$ [illegible] X [illegible]

$P = A\xi + C\eta +$ [illegible]

$A = \Sigma m$ [illegible] $=$ [illegible]

$-bc\sigma \quad +bc\sigma$

$= abc$

$\sigma =$

$$W = q\,\frac{u_1 - u_2}{l}\cdot k\,t$$

$$= k\,q\,\frac{u - u'}{\lambda}\,t \qquad u = f(x) \qquad u' = f(x+\lambda) \qquad \frac{u' - u}{\lambda} = f'(x) = \frac{du}{dx}$$

$$= k\,q\,\frac{du}{dx}\,t$$

$$= -\frac{du}{dx}\,dt$$

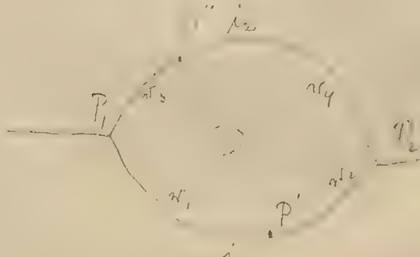
P_2 $\quad -\frac{dP}{dx} = \frac{P_1 - P_2}{l}$

$i = k\,q\,\frac{P_1 - P_2}{l}$

$i = i_1 + i_2$

$i_1 r_1 = i_2 r_2$

$i_2 = \frac{P_1 - P}{r_1}$



[illegible]

$\frac{i_1 w_2}{i_2 w_1} =$ [illegible]

[illegible]

23/3 [illegible]

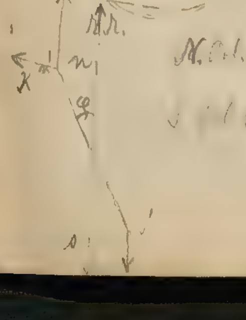
[illegible] gravitione [illegible]

[illegible]

[illegible]

$m \cdot f = 1$

[illegible]



N. Pol.: $H m \frac{\lambda}{2} \sin\varphi$ [illegible] $Z \frac{1}{2} \cos\varphi$

S. Pol.: $H m \frac{\lambda}{2} \sin\varphi$ [illegible]

$H m \lambda \sin\varphi =$ [illegible]

[illegible]

$$i = \frac{[illegible]}{4\pi c} [illegible]$$

[illegible]

[illegible]

$\varepsilon = 1$ [illegible]

[illegible]

[illegible]

1 \ 0

$\varepsilon = \frac{1}{10}$ = Ampère

$i = 10 \frac{r [illegible]}{4\pi} [illegible]$

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] Millimeter [illegible]

[illegible] 0° = 1 [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 14.10 [illegible]

24/3 [illegible]

Inisiativ [illegible]

Farad [illegible]

[illegible]

$\frac{22}{4}$ md i ws 4

[illegible] H

✓ [illegible]

$$\frac{2\pi M i}{r}\sin\varphi\, d\varphi = \text{[illegible]}$$

$$= [illegible]$$

$$w\, i\, dt = \frac{2\pi M}{r}\sin\varphi\, d\varphi$$

[illegible]

[illegible]

$$[illegible] = \frac{[illegible]}{r}$$ [illegible]

[illegible]

I [illegible] Galvanom

[illegible]

[illegible]

$$K\frac{d^2\varphi}{dt^2} = -MH\sin\varphi - \frac{2\pi M i}{r}\sin\varphi$$

$$[illegible] = \frac{2\pi M}{r}\sin\varphi\, d\varphi$$

$$i = \frac{2\pi M}{w r}\sin\varphi\frac{d\varphi}{dt}$$

$$K\frac{d^2\varphi}{dt^2} = -MH\sin\varphi - \frac{4\pi^2 M^2}{w r^2}\sin^2\varphi\frac{d\varphi}{dt}$$

[illegible]

10^7 [illegible] = 1 [illegible] = [illegible]

= [illegible] 10^6 [illegible]

[illegible]

108.10^6 = [illegible]

10^8 = Volt = [illegible]

= [illegible]

= [illegible]

= [illegible]

= 10^7 [illegible]

735 [illegible] = 1 [illegible]

[illegible] = 3/4 [illegible]

[illegible]

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